Respostas da Lista de Exercícios 6
MAT139

2. Obtemos $q_1 = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$, $q_2 = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$, $q_3 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$. Na forma $A = QR$:

$$\begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix}.$$

3. $q_1 = \begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} \\ 0 \end{pmatrix}$, $q_2 = \begin{pmatrix} \frac{1}{\sqrt{6}} \\ -\frac{1}{\sqrt{6}} \\ \frac{2}{\sqrt{6}} \end{pmatrix}$, $q_3 = \begin{pmatrix} -\frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} \end{pmatrix}$;

$$\begin{pmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{pmatrix} = \begin{pmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{6}} & -\frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{6}} & \frac{1}{\sqrt{3}} \\ 0 & \frac{2}{\sqrt{6}} & \frac{1}{\sqrt{3}} \end{pmatrix} \begin{pmatrix} \sqrt{2} & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ 0 & \frac{3}{\sqrt{6}} & \frac{1}{\sqrt{6}} \\ 0 & 0 & \frac{2}{\sqrt{3}} \end{pmatrix}.$$

4. $q_1 = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ -1 \\ 0 \\ 0 \end{pmatrix}$, $q_2 = \frac{1}{\sqrt{6}} \begin{pmatrix} 1 \\ 1 \\ -2 \\ 0 \end{pmatrix}$, $q_3 = \frac{1}{2\sqrt{3}} \begin{pmatrix} 1 \\ 1 \\ 1 \\ -3 \end{pmatrix}.$

5. $q_1 = \frac{1}{3} \begin{pmatrix} 1 \\ 2 \\ -2 \end{pmatrix}$, $q_2 = \frac{1}{3} \begin{pmatrix} 2 \\ 1 \\ 2 \end{pmatrix}$, $q_3 = \frac{1}{3} \begin{pmatrix} -2 \\ 2 \\ 1 \end{pmatrix}$. O núcleo à esquerda.

$\tilde{x} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}.$

7. $y = \frac{1}{3}$.

8. A função nula. $y = -\pi x$.

9. $a_0 = \frac{1}{2}$, $b_{2n-1} = \frac{2}{\pi(2n-1)}$ e os outros são nulos.

10. a. $a_1 = (1,0,0,1)$, $a_2 = (0,1,0,1)$, $a_3 = (0,0,1,1)$. b. $a_4 = (1,1,1,-1)$. c. $b_1 = \frac{1}{2}(1,1,1,3)$, $b_2 = \frac{1}{2}(1,1,1,-1)$.